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Baby's Birth Plan

A Review of the Research on Pregnancy and Birth

by

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Nothing in this presentation should be construed as medical advice. This document is educational in nature, prepared by a childbirth educator who is not a medical provider. It is strictly intended to provide a general overview of the literature; the topics may not apply to you as an individual. It is not intended to be, nor should it be used as, a substitute for prenatal care and advice from a medical provider (e.g., midwife, nurse, nurse practitioner, doctor, etc.). Prenatal care is important; please see your medical provider for consultations, care, and advice. The author assumes no responsibility for your actions or decisions based upon your reading of this presentation.

Medical Model versus Physiological Model of Birthing

Medical Model

- Pregnancy is a pathology
- Potentially invasive interventions, including unnecessary routine interventions in low-risk situations

Physiological Model

- Trust in nature's way of birthing
- Hands-off, with loving support for mom-baby-partner

Which is best supported by evidence-based research?

Evidence-Based Medicine (EBM) is...

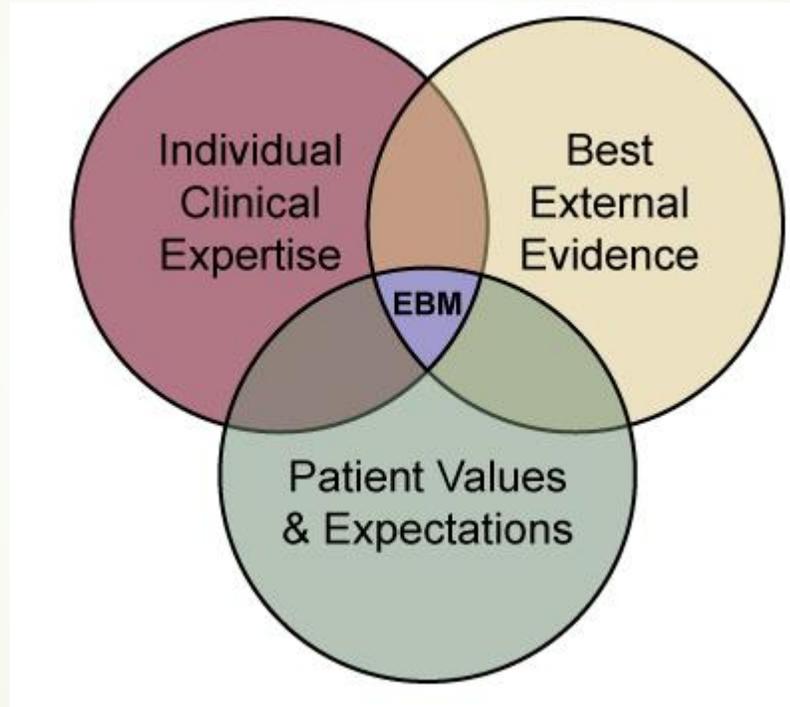


Photo Credit: community.cochrane.org

Why Isn't Evidence-Based Care Standard Practice?

Care providers do not follow clinical practice guidelines due to:

- Lack of awareness or familiarity with the evidence
- Lack of agreement with what the guidelines recommend
- Lack of self-efficacy (i.e., they don't trust in their ability to change)
- Lack of positive expectancy (i.e., they don't expect a positive outcome from making the change)
- Lack of willingness or motivation to overcome the inertia of previous practice
- Lack of policies which require implementing the guidelines (Cabana et al. 1999)

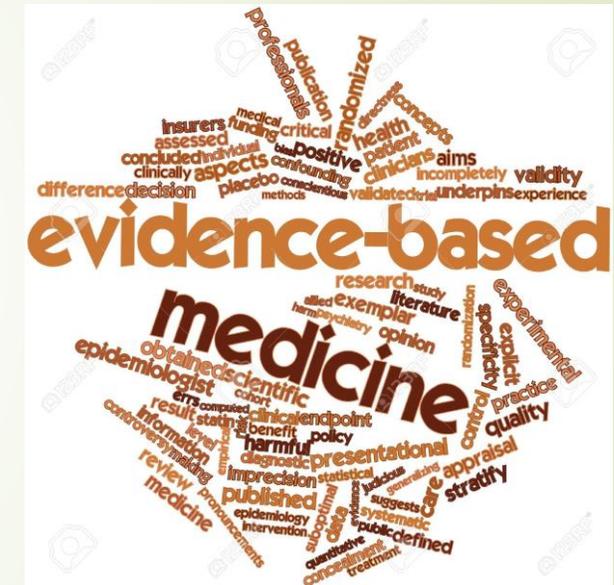


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ACOG's Guidelines



- Even the guidelines produced by the American College of Obstetricians and Gynecologists (ACOG) are not evidence-based
- “One third of the recommendations put forth by the College in its practice bulletins are based on good and consistent scientific evidence”
- Another 1/3 are based on limited or inconsistent evidence
- The final 1/3 are based on consensus and opinion, which is subject to bias (Wright et al. 2011)
- “When compared to the guidelines from the Royal College of Obstetricians and Gynaecologists, 28% of obstetric recommendations were the same, 56% were not comparable, and 16% were **opposite!**” (Romm 2011)

How Can We Make Evidence-Based Care Standard Practice?

- Change has to come from the pregnant couples requesting evidence-based care and questioning current practices, when appropriate
- Our job is to help educate them on where the evidence can be found and how to access it
- Notice that I did not say that we should tell them what to do, based upon what the evidence demonstrates; they must decide this in consultation with their care providers



Photo Credit: www.doulaville.com

Methods

- ▶ Cochrane Collaboration reviews and meta-analyses
 - www.summaries.Cochrane.org
- ▶ Articles from PubMed or PubMed Central, National Center for Biotechnology Information, US National Library of Medicine
 - <http://www.ncbi.nlm.nih.gov/pubmed> (usually just summaries)
 - <http://www.ncbi.nlm.nih.gov/pmc/> (entire articles for free)
- ▶ Articles from Google Scholar
 - <https://scholar.google.com/>

Structure

- ▶ From the perspective of the baby: if I were the baby, what type of care does the evidence say I should want for my mom and myself throughout pregnancy, labor, and birth?
- ▶ Following the chronological progression of medical care from (before) conception through the first days of the baby's life
- ▶ At the end of each section, there are slides labeled "The Research Shows..." These slides are based upon the evidence shown in the research
- ▶ Each section is summed up with a slide labeled "As the Baby, I Want..." These slides are based upon the author's opinion, based upon a review of the research literature
- ▶ Be sure to read the "Notes" sections throughout—lots more information there!



First, I want my
mom to make
sure she is healthy
prior to
conceiving me

The Microbiome

- ▶ Our microbiome consists of all of the organisms that live within and on us (e.g., bacteria, fungi, viruses, protozoa)
 - ▶ 1,000 species in our intestines
 - ▶ 700 species in our mouth
 - ▶ 300-400 species in our vagina
 - ▶ 700 species on our skin
- ▶ We need diversity in our microbes in order to fight pathogens and stave off disease—they are integral to our immune and metabolic health—but we have collectively lost about 1/3 of our microbes due in large part to:
 - ▶ Antibiotics and antimicrobial products (kill off the good bacteria as well as the pathogens)
 - ▶ Lifestyle/diet (Blaser, as quoted in Harman T, Wakeford A 2014)
- ▶ The National Institutes of Health (NIH) launched the Human Microbiome Project in 2007 to study how our microbiomes may lead to various non-communicable diseases (NCDs)

(All information from Harman T, Wakeford A 2014)

The Microbiome

The health of the microbiome has been associated with several non-communicable diseases:

- ▶ Allergies
- ▶ Asthma
- ▶ Celiac disease and Irritable bowel syndrome (IBS)
- ▶ Diabetes
- ▶ Eczema
- ▶ Mental health issues, such as Autism Spectrum Disorder
- ▶ Necrotic enterocolitis (NEC) in newborns
- ▶ Obesity (Harman T, Wakeford A 2014)

The Microbiome



Photo Credit: http://www.babyknowledge.co.uk/wp-content/uploads/2013/08/bk-laughing-baby_postcard.jpg

We lay the groundwork for the life-long health of our children through the way in which we prepare our bodies for conception, care for our bodies during pregnancy, and birth our babies

The Healthy Microbiome Model



The Microbiome

For a detailed presentation on the microbiome and its importance to the development of long-term health, please see:

Nicholson L. Seeding Lifelong Health: The Impact of Pregnancy, Birth, and Infant Care on the Baby's Developing Microbiome. 2015.

Further information can be found at:

- ▶ American Microbiome Institute: <http://www.microbiomeinstitute.org/?gclid=CJDxpefzksgCFdYUHwodF3wDRQ>
- ▶ Gut Microbiota Worldwatch (the European Society of Neurogastroenterology and Motility): <http://www.gutmicrobiotawatch.org/en/home/>
- ▶ *Microbiome*, the journal: <http://www.microbiomejournal.com/>
- ▶ NIH Human Microbiome Project: <http://hmpdacc.org/>

The Research Shows...



- ▶ The fetal immune system depends on adequate maternal nutrition; the mother's intake of the micronutrients folate, iodine, and Vitamin D, and the fatty acid DHA, is especially important
- ▶ An unbalanced microbiome has been associated with several health challenges including: asthma, eczema, diabetes, and obesity (Munyaka PM, Khafipour E, Ghia J-E 2014)
- ▶ The greatest challenges to the healthy development of the baby's microbiome are: Cesarean delivery; antibiotic exposure before, during, or after birth; and formula feeding (Mueller et al. 2015)
- ▶ The most important steps that can be taken to ensure the proper "seeding" of the baby are:
 - ▶ Step 1: Vaginal birth
 - ▶ Step 2: Immediate skin-to-skin contact with the mother following birth
 - ▶ Step 3: Exclusive breastfeeding (preferably for at least six months) (Harman T, Wakeford A 2014)

As the Baby, I Want...



As the baby who wants to be conceived, I want:

- ▶ My mom to be of healthy weight, with a good, healthy microbiome herself (i.e., vaginal microbiome rich in lactobacilli, which is typically found in normal, healthy pregnancies) (Mueller et al. 2015)
 - ▶ Following good nutritional guidelines
 - ▶ Fermented foods and those with live cultures are especially good for gut health
 - ▶ Following the micronutrient/fatty acid recommendations, per a discussion with her care provider
 - ▶ Exercising regularly
 - ▶ Non-smoker
 - ▶ Low stress levels

Photo Credit: Lori Nicholson. Picture of Grace Kuhlmann, my youngest daughter.

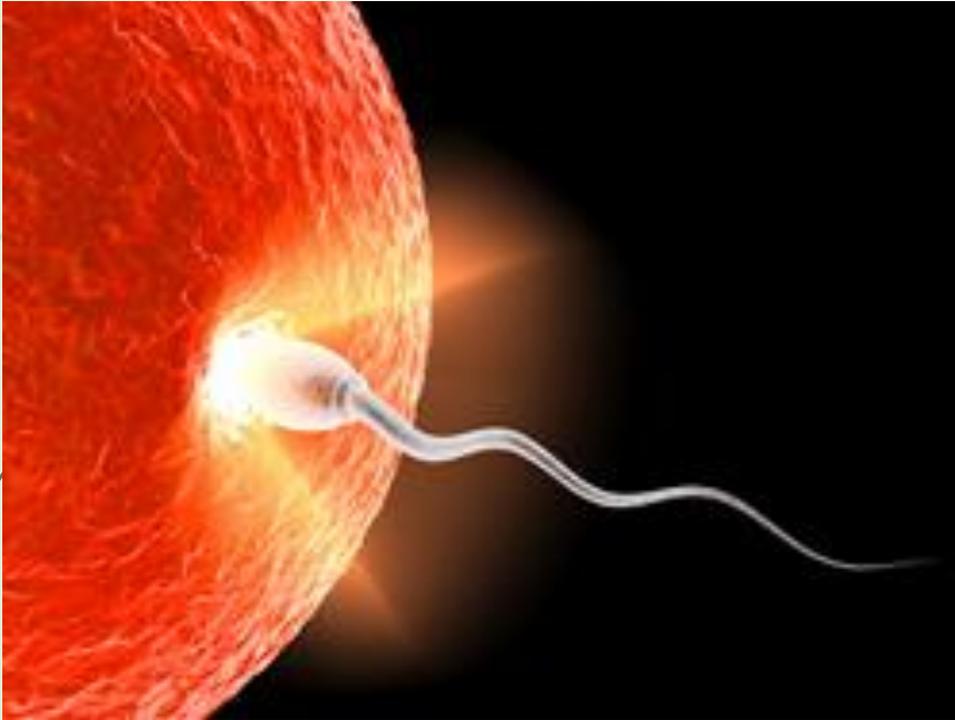


Photo Credit: www.mumsnet.com

Conception
Occurs!

Selecting a Care Provider

You are the hiring manager for **your** birth!

- ▶ If you want or need a Cesarean, you should not hire a midwife
- ▶ If you want a completely natural birth, you should not hire an OB/GYN who has a 35-40% C-section rate
- ▶ This is one of the most important decisions you will make about your birth
- ▶ Would you hire an individual who came into your office and said, “I’m really smart, I’m really well educated, I’m respected by my peers, I have enormous amounts of experience, and I don’t agree with the philosophy of your organization”? No, none of us would.

Hire a care provider whose philosophy and approach match your own

Selecting a Care Provider

“Having a highly trained obstetrical surgeon attend a normal birth is analogous to having a pediatric surgeon babysit a healthy 2-year-old.”

- Marsden Wagner, MD, former perinatologist and perinatal epidemiologist, former Regional Officer for Maternal and Child Health in the European Regional office of the World Health Organization (<http://www.allhealthreviews.com/inspirational-breastfeeding-quotes/>)

Selecting a Care Provider

In the 2013 Listening to Mothers III survey:

- ▶ 78% reported using an OB/GYN
- ▶ 9 % reported using a family physician
- ▶ 8% reported using a midwife
- ▶ 5% reported using another type of care provider (nurses who are not midwives, physician assistants, unknown type of doctor, or “not sure”) (Declercq et al. 2013)

Midwifery Model of Care

PEARLS OF MIDWIFERY

The Midwifery Model of Care

- Recognizes the woman as a unique individual in the context of her family and community
- Supports and protects the normal physiologic process of labor and birth
- Establishes the woman as an active partner in her own care

Rooks, 1999

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“Midwives emphasize helping women make changes conducive to healthy pregnancies, infants, and families. Midwifery practice focuses on what is normal, with careful attention to recognizing and managing deviations from normal. **All health care providers involved in birth can provide care within the midwifery model.**”

Reference: Evidence-Based Practice: Pearls of Midwifery®: A Presentation by The American College of Nurse-Midwives. 2014.

Selecting a Care Provider: Midwives

“The American College of Obstetricians and Gynecologists (the College) and the American College of Nurse-Midwives (ACNM) affirm our shared goal of safe women’s health care in the United States through the promotion of evidence-based models provided by obstetrician-gynecologists (ob-gyns), certified nurse-midwives (CNMs), and certified midwives (CM). The College and ACNM believe health care is most effective when it occurs in a system that facilitates communication across care settings and among providers.”

- Joint Statement of Practice Relations between Obstetrician-Gynecologists and Certified Nurse-Midwives/Certified Midwives

Selecting a Care Provider: Doulas

- ▶ A doula is a “trained and experienced professional who provides continuous physical, emotional and informational support to the mother before, during and just after birth” (birth doula); there are also postpartum doulas (not covered here) (DONA website)
- ▶ Birth doulas “mother the mother” by:
 - ▶ Assisting the parents in preparing their birth plan
 - ▶ Staying with the mother throughout labor
 - ▶ Providing emotional support and physical comfort measures throughout labor
 - ▶ Assisting the parents in making important decisions about their care throughout labor and facilitating those discussions with their care providers
 - ▶ Providing support and breaks to the birth companion throughout labor (DONA website)



Photo Credit:

http://crowninglotus.typepad.com/crowning_lotus/2014/06/doulas-are-not-midwives-and-midwives-are-not-doulas.html

The Research Shows...



Women who received care from CNMs were more likely to experience (continued):

- ▶ Significant reduction in the incidence of third and fourth degree perineal tears (Newhouse et al. 2011)
- ▶ Fewer preterm births, and fewer babies with low birth weight or hypothermia (Renfrew et al. 2014)
- ▶ Lower rates of Cesarean birth (Newhouse et al. 2011; ACNM 2012b; Hamilton et al. 2010; Shaw-Battista et al. 2011)
- ▶ Lower infant mortality rates (ACNM 2012)
- ▶ Higher rates of breastfeeding (Newhouse et al. 2011; ACNM 2012b; Declercq et al. 2006)

As the Baby, I Want...



- ▶ As the baby who has been conceived:
 - ▶ I want my mom to hire a midwife for prenatal, and labor and delivery care
 - ▶ I want my mom to hire a doula to work with her throughout pregnancy and to attend her during labor

Selecting a Birthing Location

- ▶ In 2009, 7.6% of all hospital costs were attributable to maternity and newborn care, totaling over \$27 Billion (US) (Correy et al. 2012, as referenced in Kozhimannil et al. 2014)
- ▶ Maternity and newborn care was the top expenditure category for payments made by both public payers and private health insurance companies to hospitals (Andrews 2008, as referenced in Kozhimannil et al. 2014)

Maternity and newborn care = BIG MONEY!



Average Total Costs of Maternity and Newborn Care

Commercial Payers

- Cesarean = \$27,866
- Vaginal = \$18,329

C-sections are 52% more expensive

Medicaid

- Cesarean = \$13,590
- Vaginal = \$9,131

Less expensive overall, but C-sections are still 49% more expensive than vaginal births

Reference: Truven Health Analytics 2013

Selecting a Birthing Location: In-Hospital Birthing Center



Photo Credit: www.ecommunity.com

- Often staffed by midwives
- May offer care throughout pregnancy and birth, or only during labor
- Feature specially designed room ("bedroom-like" with good ambience)
- When compared to standard hospital rooms, the alternative setting increased the likelihood of:
 - No intrapartum analgesia/anesthesia
 - Spontaneous vaginal birth
 - Breastfeeding at six to eight weeks
 - Positive views of care received (high maternal satisfaction) (Hodnett ED, Downe S, Walsh D 2012)

Selecting a Birthing Location: Freestanding Birth Centers

- ▶ The American Association of Birth Centers (AABC) defines a birth center as “a home-like setting where care providers, usually midwives, provide family-centered care to healthy pregnant women”
 - ▶ Subscribe to the “wellness” model of birth, using interventions only when medically necessary
 - ▶ Integrated within the health system, for safe, uninterrupted care during transfers (Dekker – AABC website)
- ▶ One study found that 80.9% of the women who gave birth in a freestanding birth center with a collaborative practice group (midwives and physicians) gave birth vaginally versus 62.8% in an all-physician group (Jackson et al. 2003)
- ▶ Since 1990, the 21 countries that were most successful in reducing maternal mortality rates (by at least 2.5% per year) also had substantial increases in births taking place in freestanding birth facilities, attended by midwives (Renfrew et al. 2014b)

Selecting a Birthing Location: Home Births



Photo Credit: Betsy King,
<http://www.babble.com/babble-voices/what-a-home-birth-looks-like/>

- ▶ In the UK: 80% of women gave birth at home in the 1920s→2.3% gave birth at home in 2011 (Office of National Statistics 2012)
- ▶ In the US: 50% of women gave birth at home in 1938→0.89% gave birth at home in 2012 (up from 0.56% in 2004) (MacDorman M, Mathews TJ, and Declercq E 2014)
- ▶ Rates of planned home births range from 0.1% in Sweden to 20% in the Netherlands (Zielinski R, Ackerson K, Kane Low L 2015; de Jonge et al. 2014)
- ▶ Small, but significant, increases are being seen in home birth, especially in developed countries (Zielinski R, Ackerson K, Kane Low L 2015)

Selecting a Birthing Location: Home Births

- ▶ 2014 landmark study of 16,924 women who planned a home birth with a midwife, using Midwives Alliance of North American Statistics Project (MANA Stats) 2.0 data —the largest analysis of home birth in the US ever published
- ▶ Maternal Outcomes:
 - ▶ 89.1% gave birth at home (majority of intrapartum transfers were for failure to progress)
 - ▶ 4.5% required oxytocin (versus national rates of 24% for labor induction and 16% for augmentation in term pregnancies)
 - ▶ 4% used epidural analgesia (versus 67% national rate)
 - ▶ 1.4% rate of episiotomy (versus 25% national average) (Cheyney et al. 2014)



Selecting a Birthing Location: Home Births

- ▶ Maternal Outcomes (continued):
 - ▶ 93.6% spontaneous vaginal birth
 - ▶ 1.2% assisted vaginal birth (e.g., forceps, vacuum) (versus 3.5% national average)
 - ▶ 5.2% Cesarean birth (versus 31% national average)
 - ▶ Of the 1,054 women attempting a VBAC, 87% were successful
 - ▶ Low rate of postpartum maternal transfer (1.5%) (Cheyney et al. 2014)



Selecting a Birthing Location: Home Births

- ▶ Infant Outcomes:
 - ▶ Among these women who planned a home birth with a midwife, the babies were at very low risk for:
 - ▶ Being born prematurely (2.5%)
 - ▶ Being born too small (<1%): the babies weighed an average of eight pounds at birth
 - ▶ Having a low 5-minute Apgar score (1.5%)
 - ▶ Requiring a transfer to a hospital after being born at home (1%)
 - ▶ 98% of the infants were being breastfed, and the majority (86%) were being exclusively breastfed, at 6 weeks of age
 - ▶ Excluding lethal anomalies, intrapartum (1.30/1,000), early neonatal (0.41/1,000), and late neonatal (0.35/1,000) mortality rates were similar to the rates found in other studies and in national data (Cheyney et al. 2014)



Selecting a Birthing Location: Remember the Microbiome!



Photo Credit: www.drperlmutter.com

- ▶ When the baby is born, s/he is “seeded” with mom’s microbes **and** the microbes in her/his environment
- ▶ As discussed, the foundation for baby’s long-term health is laid at this time
- ▶ We have no research to inform what impact different birthing environments may have on the baby’s microbiome; however:
 - ▶ Being in one’s home environment may support this “seeding” process—exposing baby only to his/her own family’s microbes
 - ▶ Babies born in a hospital or birthing center may benefit from being exposed only to those items that have been brought from home (e.g., blankets, clothing) immediately following birth

The Research Shows...



- Maternity care = big bucks for hospitals (Andrews 2008, as referenced in Kozhimannil et al. 2014)
- C-sections are approximately 50% more expensive than vaginal births (Truven Health Analytics 2013)
- The move from home to hospital birth has led to:
 - Greater use of technology
 - Loss of autonomy for midwives (Declercq et al. 2001)
- Health systems where midwives do not practice have:
 - Higher rates of interventions
 - Inequalities in care provision and outcomes
 - Higher elective Cesarean rates (Renfrew et al. 2014; Gibbons et al. 2010)
- Strong evidence shows that hospital policies for laboring women (e.g., electronic fetal monitoring, IV fluids, no food or drink, restriction to bed, artificial induction): do no good, and may cause harm (Dekker – AABC website)

As the Baby, I Want...



As the baby in my mom's womb, I would like her to:

- Seek midwifery-led care, whether in a hospital-based birthing center or elsewhere
- Consider a birthing center birth or a planned home birth, following a discussion of the risks with her care provider



Photo Credit: www.hngn.com

Getting bigger...

Estimated Due Date (aka “A Set-Up for Anxiety”)



Photo Credit:
www.roanokechowan.edu

- Due dates are typically calculated as 280 days (40 weeks, or 10 lunar months) from the first day of the last menstrual period (LMP); alternatively, add seven days to the first day of the LMP and count forward nine months (or back three months and add one year) (WebMD 2015; Baskett TF, Nagele F 2000; Grzybowski S, Nout R, Kirkham CM 1999)
- This calculation is known as Naegele’s rule, which assumes a “typical” 28-day cycle
- None of the professors who originally wrote in the 18th and 19th centuries about how to calculate due dates ever specified whether the counting should begin with the **first** day of the woman’s LMP, or the **last** day of the woman’s LMP (Baskett TF, Nagele F 2000)

Estimated Due Date

- ▶ Only 3.6% of deliveries take place on the estimated due date (EDD) when relying on LMP dating; early ultrasound increases that slightly to 4.3-5% of births occurring on the EDD (Grzybowski S, Nout R, Kirkham CM 1999; Mongelli M, Wilcox M, Gardosi J 1996; Khambalia et al. 2013)
- ▶ Two-thirds of births occur within seven days of the EDD, with no meaningful differences in the estimated dates based upon the timing of the ultrasound scans (Khambalia et al. 2013)
- ▶ Several researchers have found that ultrasound estimation of gestational age predicts the expected date of delivery to be three days later than relying on Naegele's rule would suggest (Olsen 1999; Backe B, Nakling J 1994)
- ▶ Ultrasound is most accurate during weeks 11-14, with accuracy declining sharply after 20 weeks (Khambalia et al. 2013)
- ▶ ACOG states that "high-quality ultrasound measurement of the embryo or fetus in the first trimester is the most accurate method to establish or confirm gestational age" and "subsequent changes to the EDD should be reserved for rare circumstances" (ACOG 2014a; ACOG 2014b)

As the Baby, I Want...



- ▶ For my mom to be provided with a range of dates during which she is likely to give birth, to be based upon:
 - ▶ My mom's LMP
 - ▶ Possibly one early ultrasound completed between 11-14 weeks of gestation
- ▶ For me and my mom to be treated with patience and expectant management, in the absence of any special circumstances

Exercise During Pregnancy



Photo Credit:
www.fithealthymoms.com

- ▶ Excessive weight gain during pregnancy has been associated with gestational diabetes, pregnancy-related hypertension, macrosomia, and an increased risk of Cesarean section and stillbirth (Streuling et al. 2010; Muktabhant et al. 2014)
- ▶ Excessive weight gain has also been associated with greater maternal postpartum weight retention and higher childhood body mass index (BMI) in offspring (Streuling et al. 2010)
- ▶ Guidelines for engaging in physical activity while pregnant generally support “moderate intensity physical activity” throughout pregnancy, with cautions against participating in sports with risks of collisions, trauma, or falls (Evenson et al. 2014)

Exercise During Pregnancy

- ▶ A 2006 Cochrane review of 14 trials involving 1,104 low-risk pregnant women found that regular aerobic exercise helped them improve (or maintain) physical fitness (Kramer MS, McDonald SW 2006)
- ▶ A 2011 meta-analysis of 12 randomized, controlled trials of 1,073 low-risk pregnant women found significantly lower average gestational weight gains in the intervention group (those engaging in physical activity) versus the control group (Streuling et al. 2010)
- ▶ A 2014 Cochrane meta-analysis of 49 randomized controlled trials (including 11,444 women) reported that interventions involving: low glycemic foods/diets, supervised or unsupervised exercise only, or diet and exercise combined all led to similar reductions in the number of women who gained excess weight during pregnancy—each reducing the risk of excessive weight gain during pregnancy on average by 20% overall; maternal hypertension was also reduced in the intervention group (Muktabhant et al. 2014)



Photo Credit:
www.youmefit.com

Exercise During Pregnancy

- ▶ Providing individualized nutrition and exercise programs to overweight and obese pregnant women reduced the risk of excessive pregnancy weight gain (80% of the women did not exceed recommended pregnancy weight gain) and minimized weight retention at two months postpartum (Mottola et al. 2010)
- ▶ A review of the literature on physical activity during pregnancy found “sufficient empirical evidence to support the promotion of moderate to vigorous prenatal physical activity for maternal health benefits” (Symons Downs et al. 2012)
- ▶ A Canadian study found that even small amounts of maternal physical activity—20 minutes of moderate exercise three times per week during pregnancy—“enhances the newborn child’s brain development” (Université de Montréal 2013)
- ▶ A secondary analysis found that obese pregnant women were more likely to exercise if they had: a history of miscarriage; children living at home; lower pre-pregnancy weight; no nausea and vomiting; and no lower back pain during pregnancy (Foxcroft et al. 2011)



Photo Credit:
www.babble.com

Exercise During Pregnancy and Gestational Diabetes

- ▶ A 2011 meta-analysis of eight studies, including 35,000 women, found that engaging in physical activity both prior to conception and throughout pregnancy help decrease the risk of developing gestational diabetes significantly:
 - ▶ Higher levels of **pre-pregnancy** physical activity led to a 55% reduction in the risk of developing gestational diabetes
 - ▶ Physical activity undertaken in early pregnancy led to a 25% lower risk (Tobias et al. 2011)
- ▶ Exercise guidelines for women with gestational diabetes mellitus include moderate aerobic and resistance training exercises, three times per week, for 30-60 minutes per exercise session (Padayachee C, Coombes JS 2015)



Photo Credit:
www.healthisright.com

The Research Shows...



- ▶ Research and guidelines encourage pregnant women to engage in regular, moderate intensity physical exercise, both prior to conception and throughout pregnancy (Evenson et al. 2014; Symons Downs et al. 2012):
 - ▶ To improve or maintain physical fitness (Kramer MS, McDonald SW 2006)
 - ▶ To reduce gestational weight gain (Streuling et al. 2010; Muktabhant et al. 2014; Mottola et al. 2010))
 - ▶ To reduce maternal hypertension (Muktabhant et al. 2014)
 - ▶ To reduce postpartum weight retention (Mottola et al. 2010)
 - ▶ To decrease the chances of developing gestational diabetes (Tobias et al. 2011)
 - ▶ Higher levels of **pre-pregnancy** physical activity led to a 55% reduction in the risk of developing gestational diabetes
 - ▶ Physical activity undertaken in **early pregnancy** led to a 25% lower risk (Tobias et al. 2011)
- ▶ Research suggests that pregnant moms who undertake moderate physical exercise for just 20 minutes per session, three times per week, may enhance their newborn baby's brain development (Université de Montréal 2013)

As the Baby, I Want...



- ▶ My mom to engage in regular, moderate intensity exercise both before her pregnancy and during her pregnancy—for her health and mine

Prenatal Ultrasound

- ▶ First and second trimester organ scans; biophysical profile (BPP); amniotic fluid index (AFI); placental grading 0-III; and Doppler umbilical, uterine and fetal artery velocity testing have been tested in randomized controlled studies on tens of thousands of women
- ▶ Tests are used to attempt to identify fetal growth restriction (FGR or IUGR), suspected placental insufficiency, and suspected postdate pregnancy (Cohain 2012)
- ▶ In the Listening to Mothers III report, 98% of mothers indicated they had had at least one ultrasound during their pregnancy, with a majority (70%) having three or more, and 23% having six or more (Declercq et al. 2013)



Photo Credit:
wisdomandbirth.blogspot.com

Prenatal Ultrasound: Safety

- ▶ One review of the literature states that intensity limits increased dramatically (more than 15 times!) from 46 mW/cm² in 1985 to a possible 720 mW/cm² in 1992, without “a comprehensive research program to evaluate possible risks in diagnostic ultrasound” (Miller 2008)
- ▶ Any safety assurance has to rely on: “1) an assumption of safety for pre-1976 ultrasound devices; 2) theoretical consideration of important bioeffects mechanisms; and 3) interpretation of published research studies which may or may not have any relation to obstetrical ultrasound” (Miller 2008)



Photo Credit: ari-cn.com

Prenatal Ultrasound: Efficacy

- ▶ A 2008 Cochrane review found that “available evidence from randomised (sic) controlled trials does not support the use of BPP as a test of fetal wellbeing in high-risk pregnancies” (Lalor et al. 2008)
- ▶ A 2010 Cochrane review found no benefits to the use of utero-placental Doppler ultrasound in the second trimester of pregnancy among women at low risk for hypertensive disorders (Stampalija T, Gyte GML, Alfireciv Z 2010)
- ▶ Based on the results of two Cochrane reviews, their own meta-analysis, and other randomized controlled trials, researchers concluded that “there is no evidence that routine ultrasonography has any impact on perinatal mortality compared to the selective use of ultrasonography based upon the clinician’s judgment” (Haws et al. 2009)
- ▶ A 2015 Cochrane review found no conclusive evidence that the use of routine umbilical artery Doppler ultrasound, or a combination of umbilical and uterine artery Doppler ultrasound, in low-risk or unselected populations benefited either mother or baby (Alfirevic Z, Stampalija T, Medley N 2015)
- ▶ Another 2015 Cochrane review found that routine late pregnancy ultrasound in low-risk or unselected women (versus no routine ultrasound testing) led to no difference in the primary outcomes of perinatal mortality, preterm birth less than 37 weeks, Cesarean rates, or induction of labor rates (Bricker L, Medley N, Pratt JJ 2015)

Prenatal Ultrasound: Efficacy

- ▶ A very recent 2015 Cochrane review found that early ultrasound (i.e., less than 24 weeks of gestation) “improves the early detection of multiple pregnancies” and improves gestational dating, which may result in fewer inductions for post maturity (Whitworth M, Bricker L, Mullan C 2015)
 - ▶ No evidence of a significant difference between the screened and control groups for perinatal death
 - ▶ Routine scans were not shown to reduce adverse outcomes for babies or lead to less health service use by mothers and babies (Whitworth M, Bricker L, Mullan C 2015)

Prenatal Ultrasound: Accuracy

- ▶ Concerns with the accuracy of ultrasound:
 - ▶ A 2006 study on the use of ultrasound for prenatal diagnosis of surgical anomalies found overall false positive rates of 12% in 2000, 11% in 2001, and 9% in 2002 (Borsellino et al. 2006)
 - ▶ One study found that 34% of ultrasound fetal weight estimates were outside the expected -10%-+10% range (Hargreaves 2011)
 - ▶ 4% of first trimester ultrasounds where the woman was told there was no viable pregnancy were wrong (false negatives) (Abdallah et al. 2011)
 - ▶ Ultrasound could not reliably identify a nuchal cord, or determine whether the cord was tight (Cohain 2010)
 - ▶ 3D Doppler ultrasounds used to detect the cord in labor were only able to detect 35% of cords around the neck, 60% of cords that were wrapped twice around the neck, and had a 20% false positive rate (Bolten et al. 2009)
 - ▶ ACOG states that the ability of ultrasound to find gross anomalies varies from 13%-85% (ACOG 2009, as referenced in Cohain 2012)

Prenatal Ultrasound: Timing

- ▶ Finnish researchers found that ultrasound at any time between 8-16 weeks was more accurate than the LMP at dating the pregnancy → number of post-term pregnancies declined from 10.3% to 2.7% (Taipale P, Hiilesmaa V 2001)
- ▶ The most accurate time to perform an ultrasound to determine gestational age is 11-14 weeks (more accurate than LMP dating, or ultrasound done at any other time); ultrasound accuracy declines sharply after 20 weeks (Khambalia et al. 2013)

The Research Shows...



- ▶ Early ultrasound improves the detection of multiples and gestational dating, which may impact interventions that women are offered (Whitworth M, Bricker L, Mullan C 2015)
- ▶ Other studies, literature reviews, and a meta-analysis found that “no routine ultrasound screening protocol improves outcomes” (Lalor et al. 2008; Stampalija T, Gyte GML, Alfireciv Z 2010; Haws et al. 2009; Alfirevic Z, Stampalija T, Medley N 2015; Bricker L, Medley N, Pratt JJ 2015)
- ▶ Dramatic increases in intensity limits and peak exposures for ultrasound have been implemented without a coordinated effort to study the safety of these new, higher limits (let alone the initial limits, which were “assumed safe”) (Miller 2008)
- ▶ The lack of accuracy of ultrasound is very concerning (Borsellino et al. 2006; Hargreaves 2011; Abdallah et al. 2011; Cohain 2010; Bolten et al. 2009)
- ▶ *If* an ultrasound is going to be performed for gestational dating purposes, it should take place between 11-14 weeks of gestation (TaipaleP, Hiilesmaa V 2001; Khambalia et al. 2013)

As the Baby, I Want...



As the baby gestating in my mother's womb I:

- ▶ May want my mom to have one “early ultrasound” (prior to 20 weeks, and preferably between 11-14 weeks) for gestational dating and to detect whether she is carrying a twin
- ▶ Would want her to decline late second trimester and all third trimester ultrasounds—including for amniotic fluid index testing or for conducting a BPP—unless there was a reason for concern that she discussed thoroughly with her care provider
- ▶ Would like to see a coordinated effort undertaken to study the safety of ultrasound (rather than just having it presumed to be safe)



Photo Credit: s3-us-west-1.amazonaws.com

The Time is Drawing
Near!

Prenatal Perineal Massage



Photo Credit:
www.pinterest.com

- ▶ Spontaneous tearing rates range from 44-79%, based upon studies where episiotomies were restricted (Soong B, Barnes M 2005; Dahlen et al. 2007)
- ▶ Tears are more likely during first vaginal births and those births where forceps or vacuum assistance are used (Aasheim et al. 2011)
- ▶ A 2013 Cochrane review found that perineal massage—undertaken by the woman or her partner “**for as little as once or twice a week from 35 weeks**”—was able to: reduce the likelihood of perineal trauma requiring suturing and the risk of episiotomy for first-time moms; and reduce the risk of pain at three months postpartum for moms who had previously birthed vaginally (Beckmann MM, Stock OM 2013)

Perinatal Perineal Massage

- ▶ A 2011 Cochrane review reported that warm compresses on the perineum during labor were found to reduce third- and fourth-degree tears to a significant degree, and were found to be acceptable to the women and their care providers (Aasheim et al. 2011)
 - ▶ Perineal massage versus hands-off was found to reduce third- and fourth-degree tears (Aasheim et al. 2011)
 - ▶ Hands-off had a significant effect on reducing the rate of episiotomy (Aasheim et al. 2011)

As the Baby, I Want...



- ▶ My mom to practice perineal massage on herself, or with the help of her partner, a few times per week, from 35 weeks onward
- ▶ My mom to feel free to use a warm compress on her perineum during labor to ease me out into the world

Happy Birthing
Day!



Photo Credit: countrylifemidwifery.com

Saline Lock (or Hep-Lock)

- ▶ Many hospitals have policies that “require” laboring women to have a saline lock or hep-lock—“just in case” ...
 - ▶ ...the woman requires an emergency C-section (all women tend to be treated as “potential C-sections” for liability reasons)
 - ▶ ...the woman experiences post-partum hemorrhage
 - ▶ ...the woman experiences retained placenta
- ▶ Saline locks are routinely inserted if: the woman needs antibiotics due to testing GBS positive; the woman is experiencing discomfort or nausea; or the woman is being induced



Photo Credit:
community.babycenter.com

Saline Lock

- ▶ Despite the widespread—almost universal—use of saline locks during labor, I could find no research studies of any design on this topic
 - ▶ While we have no data on saline locks doing any harm, we also have no research on saline locks being necessary during labor
 - ▶ Are saline locks being inserted merely for the convenience of the hospital staff—“just in case”?
- ▶ One analysis has been produced by Evidence Based Birth, which concluded that “there is little-to-no evidence for the use of a saline lock during an un-medicated labor” (Dekker 2012)

As the Baby, I Want...



- ▶ Assuming my mom is low-risk, I would like her to politely decline the saline lock, so that she can focus more on her deep relaxation for an easier, gentler birth

Fetal Monitoring



Photo Credit:
motheroffact.wordpress.com

- ▶ During labor, baby's heart rate can be monitored either intermittently (e.g., at regular intervals throughout labor) or continuously (which may restrict the mother's movements)
- ▶ Various methods can be used to monitor baby's heart rate:
 - ▶ Using a fetal stethoscope while palpating the mother's uterine contractions (known as intermittent auscultation)
 - ▶ Using a handheld Doppler ultrasound device while palpating the mother's uterine contractions (also referred to as intermittent auscultation)
 - ▶ Using a cardiotocograph (CTG) to electronically record baby's heart rate and the mother's uterine contractions on a paper trace—known as external CTG (can be used either continuously or intermittently)
 - ▶ Using a CTG and scalp electrode, attached to baby's head, to monitor baby's heart rate—known as internal CTG (used continuously) (Alfirevic Z, Devane D, Gyte GML 2013)

Fetal Monitoring

- ▶ During continuous fetal monitoring, the ultrasound sensor to monitor baby's heart rate and the pressure sensor to monitor the mother's uterine contractions are never removed (except for brief bathroom breaks)
- ▶ Intermittent CTG is rarely used, but would require at least 20 minutes of monitoring per hour
- ▶ Using intermittent auscultation (IA), a care provider listens to the baby's heart rate for 60 seconds using a fetal stethoscope (fetoscope) or a hand-held Doppler:
 - ▶ Every 15 minutes during the first stage of labor (during thinning and opening)
 - ▶ Every 5 minutes during the second stage of labor (while nudging, pushing, or breathing your baby down) (Alfirevic Z, Devane D, Gyte GML 2013)



Photo Credits:
www.pregnancy.com.au and
www.promisebirth.com

Fetal Monitoring

- ▶ In the 2007 Listening to Mothers II study, **87% of US mothers described receiving continuous fetal monitoring, while only 4% received intermittent EFM** during labor (Declercq et al. 2007)
- ▶ Three major literature reviews have found that continuous CTG leads to a decrease in the rate of neonatal seizures, but an increase in the rate of C-sections and operative vaginal deliveries (Alfirevic A, Devane D, Gyte GML 2013; Thacker SB, Stroup DF, Peterson HB 1995; Thacker SB, Stroup D, Chang M 2001)
- ▶ It is estimated that **EFM leads to one additional C-section for every 58 women monitored, and one additional C-section for every 12 high-risk women** in labor (Alfirevic Z, Devane D, Gyte GML 2013)
- ▶ “Intermittent use of electronic fetal monitoring at regular intervals (with stethoscopic auscultation in between) appears to be as safe as continuous electronic fetal monitoring in low risk labours” (sic) (Herbst A, Ingamarsson I 1994)

Fetal Monitoring upon Admission

- ▶ A 2012 Cochrane review compiled results from four randomized, controlled trials with more than 13,000 women and found:
 - ▶ There was no evidence of benefit for the use of the 20-minute fetal monitoring CTG upon admission for low-risk women
 - ▶ Admission CTG increases the C-section rate by approximately 20%
 - ▶ Women who were allocated to the “EFM upon admission” group were more likely to experience continuous EFM throughout labor (Devane et al. 2012)

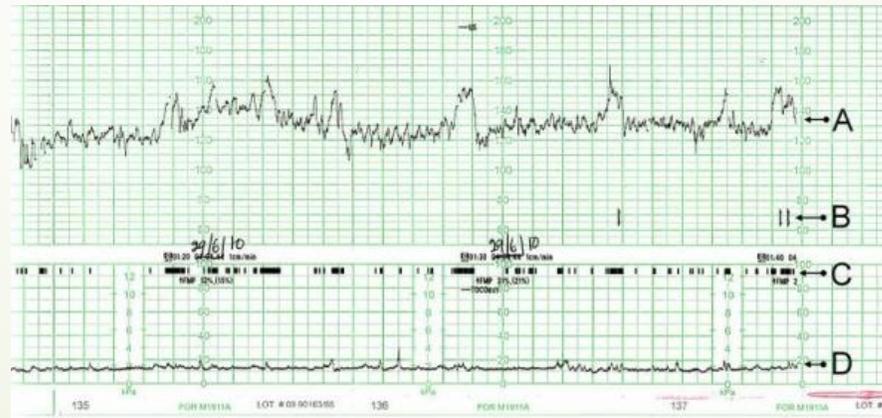


Photo Credit: mylocalhealthguide.com

Fetal Monitoring Efficacy and Safety

- ▶ A 2008 National Institute of Child Health and Human Development Workshop Report on EFM reported that “with the high penetrance of this technology into obstetric practice, well-designed studies are needed to fill gaps in knowledge” (Macones et al. 2008)
- ▶ An updated technology assessment of EFM/CTG stated that “our findings of insufficient evidence of efficacy and concerns about safety have been confirmed by subsequent research” (Banta HD, Thacker SB 2002)
- ▶ Might hospital policies that support continuous EFM be based upon liability fears, as opposed to clinical research?

As the Baby, I Want...



- My mom to have intermittent auscultation during labor

Length of Labor

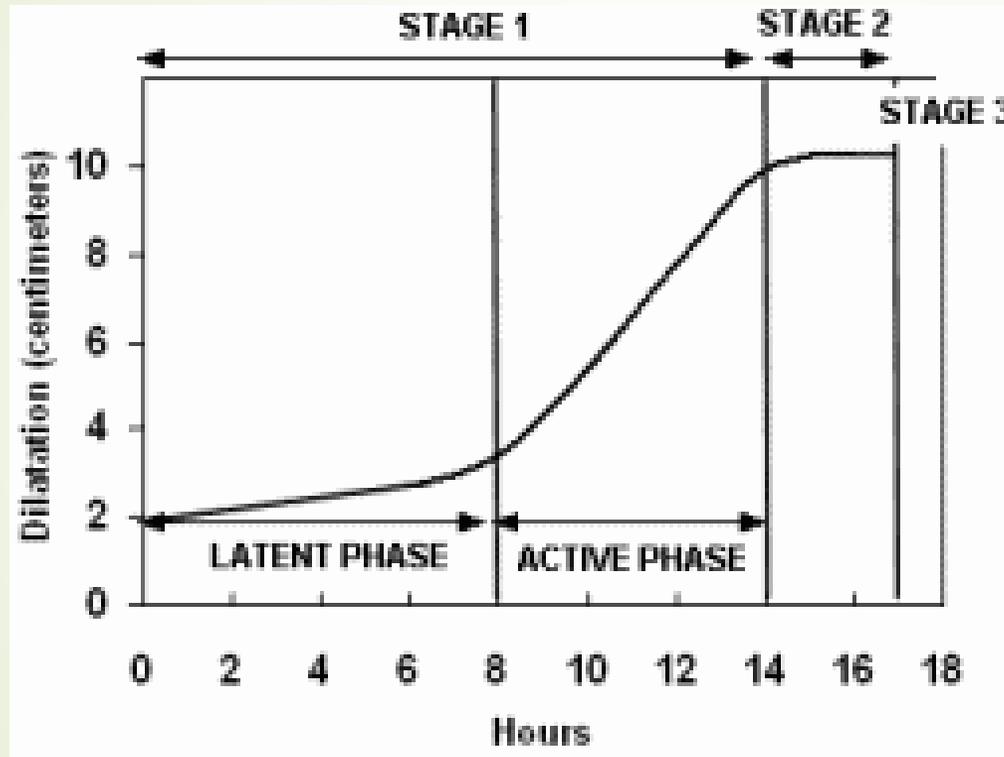
- ▶ The “typical” labor curve impacts care providers’ expectations about the progression of labor
- ▶ If the care provider is concerned about how labor is progressing, s/he may declare “failure to progress” and offer or recommend additional interventions such as:
 - ▶ Amniotomy (artificial rupture of the membranes)
 - ▶ Oxytocin (Pitocin) augmentation
 - ▶ Cesarean delivery for “failure to progress”
- ▶ Once a laboring woman enters the hospital, she is put “on the clock”
 - ▶ Women tend to dislike being turned away from the labor ward before admission for delivery (Scotland et al. 2011); yet...
 - ▶ Low-risk nulliparous women who are admitted in pre-active labor are more likely to experience oxytocin augmentation, and are more likely to have a Cesarean delivery, than low-risk, nulliparous women admitted in active labor (Neal et al. 2014)

MY BODY WILL GIVE
BIRTH IN ITS OWN
TIME

I will give birth my way

Photo Credit:
www.prettypushers.com

Length of Labor: The Friedman Curve



Reference: Perinatology.com:

<http://www.perinatology.com/Reference/glossary/L/Labor.htm>

- Dr. Friedman created the original labor curve in the 1950s, known as the Friedman Curve
- Friedman reported the mean number of hours of active labor among nulliparous women as 4.4-4.9 hours (the upper limit of "normal" was considered 11.7 hours) (Friedman 1954; Friedman 1955; Friedman 1978, all as reported in Neal et al. 2010b)
- Since the 1950s, many researchers have found that the Friedman Curve creates unrealistically fast expectations about the progression of labor (Kilpatrick SJ, Laros RKJ 1989; Albers 1999; Albers LL, Schiff M, Gorwoda JG 1996; Jones M, Larson E 2003; Perl FM, Hunter DJ 1992; Zhang J, Troendle JF, Yancey MK 2002; Zhang et al. 2010a; Zhang et al. 2010b; Zhang et al. 2010c; Laughon et al. 2012; Neal et al. 2010a; Neal et al. 2010b)

Length of Labor

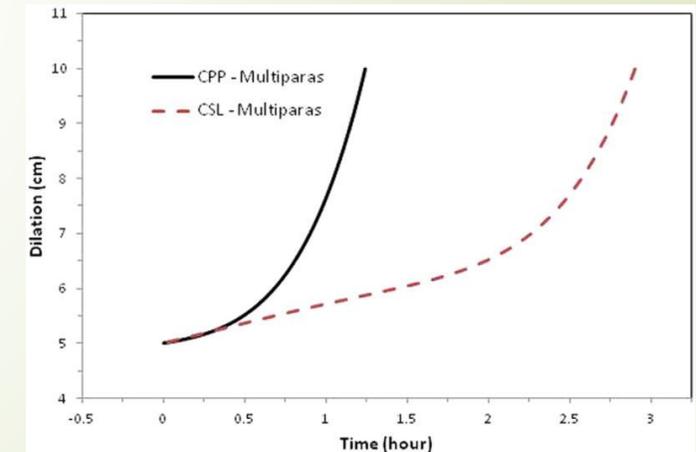
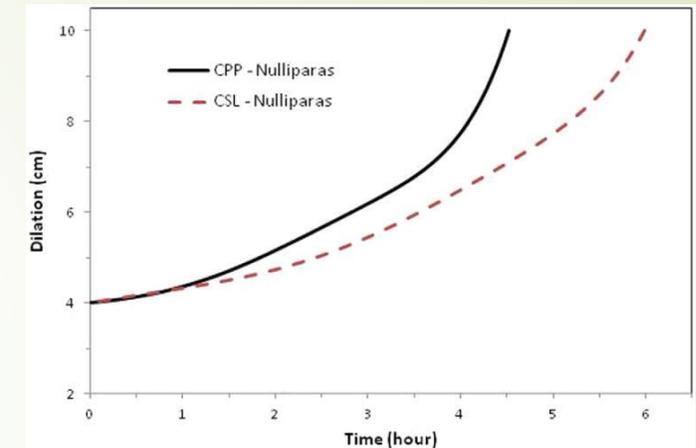
- ▶ A 2002 study found that dilation from 4 cm to 10 cm took approximately 5.5 hours, compared to 2.5 hours under the Friedman Curve (Zhang J, Troendle JF, Yancey MK 2002)
 - ▶ It was not uncommon for the women to experience no cervical dilation for more than two hours in the 2002 study group, until they reached 7 cm
 - ▶ The slowest rates of dilation (at the 5th percentile) were all below 1 cm/hour (Zhang J, Troendle JF, Yancey MK 2002)
- ▶ A 2010 literature review found that for low-risk nulliparous women with spontaneous labor onset, the slowest-yet-normal linear dilation rate is approximately 0.5 cm/hour, when starting at dilatations normally associated with active labor onset (and thus, is likely slower than 0.5 cm/hour in earlier active labor, and faster in more advanced active labor) (Neal et al. 2010b)
- ▶ The weighted mean duration of active labor was 6.0 hours (+ 2 standard deviations = 13.4 hours) and the calculated dilation rate was 1.2 cm/hour (- 2 standard deviations = 0.6 cm/hour) (Neal et al. 2010a)

Length of Labor

- ▶ Researchers reviewed data from a large cohort of women in the 1960s, using data from the National Collaborative Perinatal Project (CPP) and found that:
 - ▶ The active phase of labor for multiparous women may not begin until approximately 5 cm
 - ▶ The nulliparous women in the CPP experienced a slower, more gradual transition to the active phase than the multiparous women, beginning active labor at 6 cm
 - ▶ A two-hour threshold for diagnosing labor arrest may be too short, prior to the woman reaching 6 cm; a four-hour threshold may be too long once the woman has reached 6 cm dilation (Zhang et al. 2010c)
- ▶ The Consortium on Safe Labor (CSL) assessed labor progression in a large multicenter retrospective study and found that:
 - ▶ Labor may take over 6 hours to progress from 4 to 5 cm, and over 3 hours to progress from 5 to 6 cm
 - ▶ Nulliparas and multiparas progressed at similar rates before 6 cm; after 6 cm, labor accelerated much faster among the multiparas (as compared to the nulliparas) (Zhang et al. 2010a)

Length of Labor

- ▶ When data from the CPP cohort (1960s) is compared to that of the CSL cohort (2002-2008 data, with most women in the cohort giving birth from 2005-2007), the researchers found that:
 - ▶ Women in the CSL group were older, heavier (higher BMIs both pre-pregnancy and at delivery), more racially diverse, had higher epidural and oxytocin use, experienced Cesarean rates four times higher than the CPP group, and had heavier babies—despite giving birth earlier, on average, than the CPP group
 - ▶ The CSL group experienced fewer episiotomies and fewer operative vaginal deliveries. Labor is longer in the modern obstetrical cohort, with the first stage of labor in the CSL group lasting longer by a median of 2.6 hours among nulliparas and 2.0 hours among multiparas—even after adjusting for maternal and pregnancy characteristics (Laughon et al. 2012)

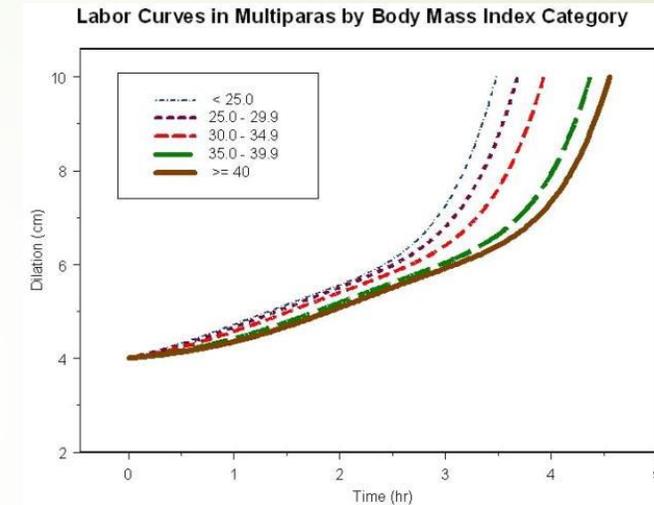
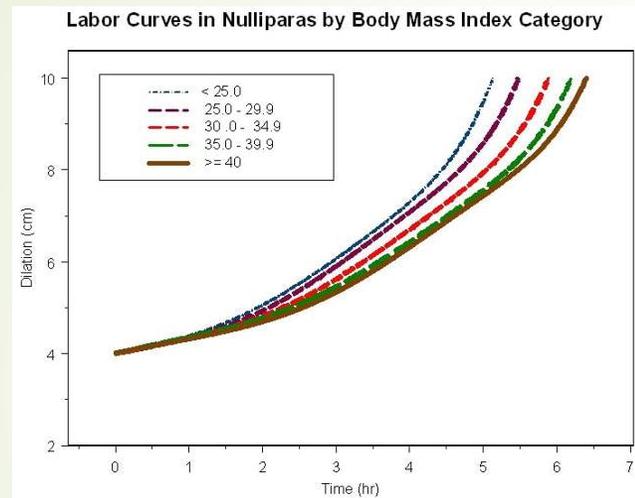


Reference: Laughon et al. 2012

Length of Labor

- ▶ When labor takes longer than care providers expect, they are more likely to suspect dystocia and label the labor as “failure to progress”
- ▶ “Failure to progress” is the most common reason for C-sections in the United States, with 35.4% of primary Cesareans attributable to “failure to progress” (Boyle et al. 2013)
- ▶ In one study, among those women who experienced primary Cesarean for failure to progress, “42.6% of primiparous women and 33.5% of multiparous women never progressed beyond 5 cm dilation” before being taken to the operating room; among women who reached the “pushing phase,” 17.3% of women who had reached the “pushing phase” were given a C-section for arrest of descent at <2 hours (Boyle et al. 2013)
- ▶ In another large study, among women who reach the “pushing phase,” 1 of every 3 C-sections that were performed for “failure to progress during pushing” were performed at <3 hours for first-time moms; 1 out of every 4 C-sections were performed at <2 hours for experienced mothers (Zhang et al. 2010b)
- ▶ However, the 2003 ACOG guidelines define “arrest of descent” as >3 hours for nulliparas with epidurals, and >2 hours for multiparas with epidurals (epidurals can lead to a slower pushing phase) (Zhang et al. 2010b)

Length of Labor and Body Mass Index (BMI)



- As body mass index increases, labor proceeds more slowly (Kominiarek et al. 2011; Norman et al. 2012)
- The time difference to reach 10 cm was 1.2 hours from the lowest to the highest BMI categories for first-time moms (Kominiarek et al. 2011)
- Median time to progress from 4-10 cm:
 - Nulliparas (women who have never given birth):
 - 5.4 hours for BMI $< 25 \text{ kg/m}^2$ versus 7.7 hours for BMI $\geq 40 \text{ kg/m}^2$
 - Multiparas (women who have given birth two or more times):
 - 4.6 hours for BMI $< 25 \text{ kg/m}^2$ versus 5.4 hours for BMI $\geq 40 \text{ kg/m}^2$ (Kominiarek et al. 2011)

Length of Labor

- ▶ Data from the Consortium on Safe Labor demonstrate how: 1) contemporary labor is slower than historically described; and 2) “active labor” does not begin until 6 cm dilation
- ▶ “A prolonged latent phase (e.g., greater than 20 hours in nulliparous women and great than 14 hours in multiparous women) should not be an indication for cesarean delivery” (ACOG 2014)
- ▶ “Given these data, as long as fetal and maternal status are reassuring, cervical dilation of 6 cm should be considered the threshold for the active phase of most women in labor...Further, cesarean delivery for active phase arrest in the first stage of labor should be reserved for women at or beyond 6 cm of dilation with ruptured membranes who fail to progress despite 4 hours of adequate uterine activity, or at least 6 hours of oxytocin administration with inadequate uterine activity and no cervical change” (ACOG 2014)

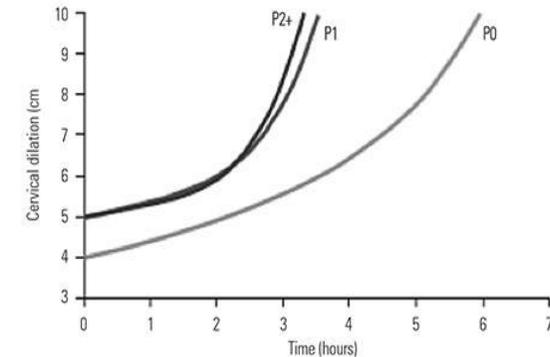


Fig. 4. Average labor curves by parity in singleton term pregnancies with spontaneous onset of labor, vaginal delivery, and normal neonatal outcomes. Abbreviations: P0, nulliparous women; P1, women of parity 1; P2+, women of parity 2 or higher. (Modified from Zhang J, Landy HJ, Branch DW, Burkman R, Haberman S, Gregory KD, et al. Contemporary patterns of spontaneous labor with normal neonatal outcomes. Consortium on Safe Labor. *Obstet Gynecol* 2010;116:1281–7.)

Figure taken from ACOG 2014

Joint Workshop of ACOG, the Society for Maternal Fetal Medicine, and the National Institute for Maternal and Child Health

- ▶ “Care providers should stick to proper definitions of labor arrest, and avoid using the vague term ‘failure to progress’
- ▶ Women should be given an adequate time for both labor and pushing—and an ‘adequate’ time is much longer than what has traditionally been allowed in the past
- ▶ Inductions should only be labeled ‘failed’ after at least 24 hours of Pitocin (plus water broken, if possible)—this clock should not start until after cervical ripening is completed, if needed
- ▶ Women—particularly first-time mothers—with an unripe cervix should not be induced unless the delivery is medically necessary
- ▶ Each care provider should receive quality control feedback on how often they improperly diagnose labor arrest or ‘failed induction’” (Spong et al. 2012)

The Research Shows...



- ▶ Women's labors tend to be much slower today than when Friedman created his labor curve, even when adjusting for maternal and pregnancy characteristics (Kilpatrick SJ, Laros RKJ 1989; Albers 1999; Albers LL, Schiff M, Gorwoda JG 1996; Jones M, Larson E 2003; Perl FM, Hunter DJ 1992; Zhang J, Troendle JF, Yancey MK 2002; Zhang et al. 2010a; Zhang et al. 2010b; Zhang et al. 2010c; Laughon et al. 2012; Neal et al. 2010a; Neal et al. 2010b):
 - ▶ Friedman's "lowest acceptable rate" of cervical dilation was 1.2 cm per hour (Dekker 2013); however, that would now be considered either normal or quick
 - ▶ Modern cervical dilation times range from a slowest-yet-normal rate of 0.5 cm/hour to an average of 1.2 cm/hour (Neal et al. 2010b; Neal et al. 2010a)
- ▶ "Active labor" does not begin until 6 cm and does not happen in a smooth curve (i.e., there may be long times when no dilation occurs) (Zhang et al. 2010a; ACOG 2014)

Six is the
new Four!

As the Baby, I Want...



- If birthing in a birthing facility or hospital, I would like for my mom to labor at home until she is in active labor
- My mom to be given an adequate amount of time to labor and to breathe/nudge me down (what other people call “pushing”)
- My mom’s birthing space to be supportive of her natural birth wishes (emergency resuscitation equipment out of plain sight, privacy, “sacred space” with access to props and tubs as requested)
- My mom to have supportive, **patient** care providers who will provide her with comfort measures and the gift of time—no rushing

Birthing Positions

- ▶ Women in developed countries who give birth in a health facility tend to labor in bed—not because of any advantage to the woman or her baby, but because it is more convenient to staff (Lawrence et al. 2009)
- ▶ Most women value the option to be mobile during labor and feel that normal birth processes should not be interfered with unless medically necessary (Declercq et al. 2013; Scotland et al. 2011)
- ▶ Several studies have found advantages to movement in labor, including: reducing fear; helping women cope with discomfort during labor; and helping move the bones of the pelvis to help the baby find the best fit (Adams SS, Eberhard-Gran M, Eskild A 2012; Simkin P, Ancheta R 2011; Storton S 2007; Ondeck 2014)
- ▶ Yet hospital policies often conflict with this need for movement and changing position—especially when continuous fetal monitoring or intravenous infusions are used (Laughon et al. 2012; Hollins-Martin C J, Martin C 2013; Ondeck 2014)



Photo Credit:

<http://www.takingcharge.csh.umn.edu/activities/effective-birthing-positions>

Birth Positions: First Stage of Labor (Thinning and Opening)

- ▶ Women who adopt an upright position (including sitting) or who walk during the first stage of labor experience:
 - ▶ Reduced length of first stage labor (Souza et al. 2006; Lawrence et al. 2013; Adachi K, Shimada M, Usui A 2003; Priddis H, Dahlen H, Schmied V 2012)
 - ▶ Reduced likelihood of having epidural analgesia (Lawrence et al. 2013; Priddis H, Dahlen H, Schmied V 2012)
 - ▶ Lower levels of reported pain (Priddis H, Dahlen H, Schmied V 2012)
 - ▶ Less likelihood of a Cesarean section (Lawrence et al. 2013)
 - ▶ Higher reported satisfaction with their childbirth experience than those women who use semirecumbent or supine positions (Priddis H, Dahlen H, Schmied V 2012)
- ▶ One study found that the first stage of labor is not shortened by using an upright position, but that upright positions are safe and well-accepted by women (Miquelutti MA, Cecatti JG, Makuch MY 2010)
- ▶ Women tend to naturally move around when experiencing contractions/surges, in order to manage any discomfort they may feel (Romano AM, Lothian JA 2008)
- ▶ Upright maternal positions during the first stage of labor is a safe practice that may benefit patients (Souza et al. 2006)

Birth Positions: Second Stage of Labor ("Pushing" or Breathing the Baby Down)

- ▶ Several physiological advantages have been associated with assuming an upright position during the second stage of labor:
 - ▶ Increasing in the size of the pelvic outlet
 - ▶ Better alignment of the baby when passing through the pelvis
 - ▶ More efficient uterine contractions (surges)
 - ▶ Easing blood flow to the baby by keeping the mother from lying flat on her back
 - ▶ Using the force of gravity to help bring the baby down (de Jong et al. 1997; Gupta et al. 2012)
- ▶ Despite these significant benefits from using an upright position, women in the United States tend to use the following positions during "pushing":
 - ▶ Lying on their backs (68%)
 - ▶ Semi-sitting/lying position with the head of the bed raised up (23%)
 - ▶ Squatting or sitting (4%)
 - ▶ Side lying (3%)
 - ▶ Hands-and-knees position (1%) (Declercq et al. 2013)

Birth Positions: Second Stage of Labor (“Pushing” or Breathing the Baby Down)

- ▶ A 2012 Cochrane review of 22 randomized, controlled trials of more than 7,200 women, found that women who were randomly assigned to upright (sitting, kneeling, squatting) positions during the pushing phase (versus being in a side-lying, semi-sitting/lying, or back-lying position) experienced:
 - ▶ Fewer assisted deliveries (with forceps or vacuum)
 - ▶ Fewer episiotomies
 - ▶ No additional risk of second-degree tears if a birth cushion was used (there was an increased risk of tearing if a birth cushion was not used in an upright pushing position)
 - ▶ Fewer abnormal fetal heart rate patterns (Gupta et al. 2012)
- ▶ An increased risk of blood loss >500 ml was noted in the upright group, but since this was based upon provider observations/estimates, the researchers question this reported outcome (Gupta et al. 2012)



Photo Credit:
www.triadbirthdoula.com

Birthing Positions: Second Stage of Labor (“Pushing” or Breathing the Baby Down)

- ▶ Other studies have found that women who “push” in an upright position experience:
 - ▶ A shorter second stage (Gardosi J, Hutson N, Lynch CB 1989; Golay J, Vedam S, Sorger L 1993); less pain (de Jong et al. 1997; De Jonge A, Teunissen TAM, Lagro-Janssen ALM 2004; Golay J, Vedam S, Sorger L 1993)
 - ▶ Less perineal trauma (de Jong et al. 1997; Golay J, Vedam S, Sorger L 1993)
 - ▶ Fewer instrumental deliveries (De Jonge A, Teunissen TAM, Lagro-Janssen ALM 2004; Gardosi J, Hutson N, Lynch CB 1989; Golay J, Vedam S, Sorger L 1993)
 - ▶ Fewer episiotomies than those women who deliver on their backs (de Jong et al. 1997; De Jonge A, Teunissen TAM, Lagro-Janssen ALM 2004; Golay J, Vedam S, Sorger L 1993)
 - ▶ Greater satisfaction with their birth experience (Nieuwenhuijze et al. 2014; Nieuwenhuijze et al. 2013; ACNM, MANA, NACPM 2012; Green JM, Coupland VA, Kitzinger JV 1990; Gardosi J, Hutson N, Lynch CB 1989)
- ▶ **According to current research, no one position is optimal**, so women should assume positions that feel comfortable to them (Gupta et al. 2012; de Jonge et al. 2007; Kemp et al. 2013; Nieuwenhuijze et al. 2014; Rice Simpson 2006)

Birth Positions: Second Stage of Labor (“Pushing” or Breathing the Baby Down)



Photo Credit: formaternity.com

- ▶ In one Dutch study, when women were offered suggestions for birthing positions by their care provider, they were generally offered squatting or hands-and-knees positions
 - ▶ When women asked for a specific birthing position, it was usually a vertical position, such as squatting or sitting
 - ▶ Women never asked for a semi-recumbent position (Nieuwenhuijze et al. 2013)
- ▶ Two studies found that women with epidural analgesia who remained in an upright position for the second stage of labor experienced: significantly shorter times from epidural insertion to delivery (173 versus 236 minutes) (Karras et al. 2003); and significantly shorter pushing times (51 versus 73 minutes) (Golara et al. 2002) than women who were randomly assigned to remain lying down throughout the “pushing” phase

The Research Shows...



- Upright positions during the second stage of labor have been found to be beneficial to women with epidural analgesia as well (Karraz et al. 2003; Golara et al. 2002)
- “The results do not justify the continuation of the routine use of the supine position during the second stage of labor” (De Jonge A, Teunissen TAM, Lagro-Janssen ALM 2004)
- Women should push in any position they find most comfortable (Gupta et al. 2012; de Jonge et al. 2007; Kemp et al. 2013; Nieuwenhuijze et al. 2014; Rice Simpson 2006; Dekker 2012)

As the Baby, I Want...



- ▶ My mom to “nudge/push/breathe me down” in whichever position feels most comfortable to her, with an emphasis on more upright positions, and an emphasis on changing positions whenever she feels the need or desire



I am here!

Immediate Skin-to-Skin Contact (SSC) (aka Kangaroo Care)

- ▶ “Separation of human mothers and newborns is unique to the 20th century and is a complete break from natural human history” (Dekker 2013)
- ▶ Kangaroo Care, or Kangaroo Mother Care (KMC) includes three major components:
 - 1) Skin-to-Skin Care/Contact (SSC)
 - 2) Frequent and exclusive (or nearly exclusive) breastfeeding
 - 3) Treating the mother and baby as a dyad—what is sometimes referred to as “couplet care”

(Conde-Agudelo A, Diaz-Rossello JL 2014; Wildner 2012; Dekker 2013)



Photo Credit:
www.ecobabysteps.com

Skin-to-Skin Contact (SSC) (aka Kangaroo Care)

- ▶ Skin-to-skin for the mom-baby dyad following birth has many benefits:
 - ▶ Releases oxytocin (the "love" or "bonding" hormone), thus lowering cortisol levels that may have been created during the birth (Hannah Dahlen, as quoted in Harman T, Wakeford A 2014)
 - ▶ Mom's body warms up to warm baby (i.e., infant temperature stabilization) (Moore et al. 2007; Bergman NJ, Linley LL, Fawcus SR 2004; Hannah Dahlen, as quoted in Harman T, Wakeford A 2014)
 - ▶ Helps baby regulate breathing and blood sugar levels (Hannah Dahlen, as quoted in Harman T, Wakeford A 2014; Moore et al. 2007)
 - ▶ Decreases stress and crying for the baby (Hannah Dahlen, as quoted in Harman T, Wakeford A 2014; Moore et al. 2007)
 - ▶ Neurobehavioral development (Ludington-Hoe SM, Swinth JY 1996)
 - ▶ Increased maternal satisfaction and confidence (Moore et al. 2007)
 - ▶ Improved breastfeeding relationship (Ferber SG, Makhoul IR 2004; Radzyminski 2005; Moore et al. 2007)



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Immediate Skin-to-Skin Contact (SSC) (aka Kangaroo Care)



- ▶ When researchers study **human** mother-newborn contact, keeping mothers and babies together is always considered the “experimental” intervention
- ▶ When researchers study **non-human mammals**, the “experimental” intervention is separating newborns from their mothers (Moore et al. 2012, as reported in Dekker 2013)

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Skin-to-Skin Care (SSC) (aka Kangaroo Care)



Photo Credit:
boys.tajandjoseph.com

- A 2010 Cochrane review found that, for preterm and/or low birthweight babies, SSC “was shown to be effective in reducing the risk of hypothermia when compared to conventional incubator care for infants” (McCall et al. 2010)
- **“Parents are the original incubators!”** (Wildner 2012)
- Other Cochrane reviews have found SSC to be effective at decreasing procedural pain (e.g., heel sticks or lances) for neonates, infants, and young children (Johnston et al. 2014; Pillai Riddell et al. 2011)

Skin-to-Skin Care (SSC) (aka Kangaroo Care)

- ▶ One landmark Russian study found long-term effects of mother-infant interactions following birth:
 - ▶ “Skin-to-skin contact, for 25 to 120 minutes after birth, early suckling, or both positively influenced mother-infant interaction 1 year later when compared with routines involving separation of mother and infant” (Bystrova et al. 2009)
 - ▶ Poorer mother/infant bonding outcomes were found when swaddling was used
 - ▶ Poor mother/infant bonding outcomes from immediate separation were not ameliorated when rooming in was used for the remainder of the hospital stay (Bystrova et al. 2009)

Skin-to-Skin Care (SSC) (aka Kangaroo Care)



Immediate Skin-to-Skin Contact (SSC) (aka Kangaroo Care) and the Microbiome

- ▶ Immediate skin-to-skin for the mom-baby dyad following birth leads to the skin-to-skin transfer of skin bacteria to the baby
- ▶ Baby has to get his or her microbes from somewhere; we want the baby's immune system primed with the right type of bacterium (as discussed, this impacts the choice of birthing environment/facility as well)
- ▶ This is when the baby's immune system learns what is friend versus foe
- ▶ Scientists believe the microbes have one chance to do this—during birth and immediately thereafter: you can correct the “balance” of microbes with probiotics later in life, but you cannot retrain the immune system
- ▶ For additional information about the development of the baby's microbiome, please see: Nicholson L. *Seeding Lifelong Health: The Impact of Pregnancy, Birth, and Infant Care on the Baby's Developing Microbiome*. 2015.

The Research Shows...



- ▶ Immediate or very early SSC has both physiologic and psychologic benefits to the mother-baby dyad, at a very sensitive developmental time for both bonding and the microbiome
- ▶ Early SSC has a positive effect on: breastfeeding, respiration, blood glucose, and lessened crying for the babies; and less breast engorgement and anxiety for the mothers—all with “no apparent short- or long-term negative effects” (Moore et al. 2012)
- ▶ SSC may be even more important for low birthweight babies than for normal babies, as it leads to: lower rates of mortality, sepsis, hypothermia, severe illness, respiratory problems, and long hospital stays, while assisting those low birthweight babies with better growth, breastfeeding, temperature regulation, and bonding with their mothers (Conde-Agudelo A, Diaz-Rossello JL 2014; McCall et al. 2010)

As the Baby, I Want...



- My mom and me to experience immediate skin-to-skin contact
- My mom and me to be left undisturbed for bonding, initial breastfeeding, and the “seeding” of my microbiome from skin contact with my mom during “The Golden Hour” and beyond
- Care providers to do any newborn checks while I am experiencing SSC with my mom—“hands-off” from the care providers, as much as possible

Cord Clamping

- ▶ Nearly 1/3 of a baby's total blood volume is still in the placenta at birth; this is equal to the amount of blood needed to fully perfuse the baby's lungs, liver, and kidneys
 - ▶ 50% of that blood transfuses into the baby by 1 minute of age
 - ▶ 90% of that blood transfuses into the baby by 3 minutes of age (Sloan 2012)
- ▶ The concentration of stem cells in the fetal blood—which play an essential role in the development of the immune, respiratory, cardiovascular, and central nervous systems—is higher at birth than at any other time of life (Sloan 2012)



Three hours old, experiencing the calm of significantly delayed cord clamping.
Photo Credit: en.wikipedia.org

Cord Clamping

- ▶ DCC has also been associated with:
 - ▶ Smoother cardiopulmonary transition at birth (Sloan 2012)
 - ▶ An increase in antioxidant capacity and moderation of inflammatory effects in newborns (Díaz-Castro et al. 2014)
 - ▶ Higher birthweight and hemoglobin concentrations (McDonald et al. 2013)
 - ▶ Increases in iron reserves up to six months after birth; babies have low levels of iron at birth and get very little through breastfeeding (Mercer 2010; Carter et al. 2010; Chaparro 2011; McDonald et al. 2013; Andersson et al. 2011; Ceriani et al. 2010; Morley 2002)
 - ▶ Fewer transfusions for anemia and lower risk of necrotizing enterocolitis (infection of the bowel) (Rabe et al. 2012)



Cord Clamping

- ▶ All of the studies compare immediate cord clamping (ICC) to delayed cord clamping (DCC)—rather than comparing varying cord clamping times with the **normal physiological condition** of “no clamping”
- ▶ Several studies and a 2013 Cochrane review found no relationship between timing of the cord clamp and postpartum hemorrhage—one of the major reasons given for wanting to perform immediate cord clamping (ICC) (McDonald et al. 2013)
- ▶ Blood flow immediately after birth is primarily one-way, from placenta to baby, so concerns about “backflow” to baby are unwarranted
 - ▶ Confirmed by the fact that DCC leads to ~30% greater neonatal blood volume than does ICC (Mercer JS, Skovgaard R 2002; Sloan 2012)
- ▶ Gravity affects the speed of the placental transfusion, but it is still safe to place baby immediately skin-to-skin on mother’s belly while the cord finishes pulsing
 - ▶ Babies held below the level of the placenta receive a full transfusion in ~3 minutes
 - ▶ Babies held above the level of the placenta (e.g., during immediate SSC) receive a full transfusion in ~5 minutes (Mercer JS, Erickson-Owens DA 2012; Yao AC, Lind J 1969; both as reported in Sloan 2012)

Cord Clamping

- ▶ Most studies have found no significant difference in bilirubin levels, which may cause neonatal jaundice, in DCC babies versus ICC babies (Chaparro 2011; Ceriani et al. 2006; McDonald et al. 2013; Andersson et al. 2011; Hutton EK, Hassan ES 2007; Sloan 2012; Fogelson 2009)
- ▶ A 2013 Cochrane review (an update of a 2009 review) found no adverse maternal or neonatal outcomes from DCC, with the possible exception of an increased need for phototherapy as a result of increased bilirubin levels (McDonald et al. 2013)
 - ▶ Of the 40 studies considered for inclusion in this review (15 of which were included), one was an unpublished study by the Cochrane review's lead author; when the unpublished data is removed, the results lose their significance (Sloan 2013)
 - ▶ The two studies added between the 2009 and 2013 Cochrane reviews both found no association between delayed clamping and hyperbilirubinemia requiring phototherapy (Al-Tawil 2012; Andersson 2011; both as reported in Sloan 2013)

Cord Clamping

- ▶ No studies have found a problem with hyperviscosity (i.e., “thick blood”) as a result of DCC (Ceriani et al. 2006; McDonald et al. 2013; Hutton EK, Hassan ES 2007; Sloan 2012)
- ▶ Sick babies, both term and preterm, have been found to have better outcomes with DCC (Sloan 2012; Mercer et al. 2006; Mercer et al. 2010; Kinmond et al. 1993; Rabe et al. 2000; WHO 2015)



Photo Credit:
combatbootmama.com

Cord Clamping

“Late cord clamping is recommended for all births, and the improved iron status associated with it may be particularly relevant for infants living in low-resource settings with reduced access to iron-rich foods.”

- WHO 2015



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The Research Shows...

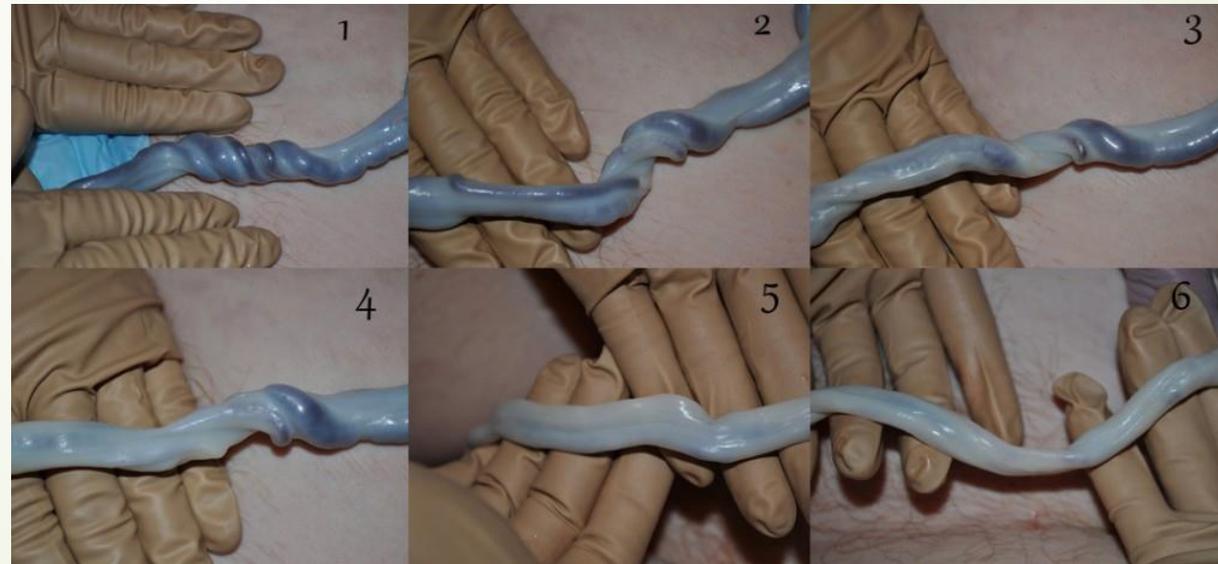


- ▶ “Many maternity care providers continue to clamp the umbilical cord immediately after an uncomplicated vaginal birth, even though the significant neonatal benefits of delayed cord clamping (usually defined as 2 to 3 minutes after birth) are now well known” (Sloan 2012)
- ▶ No adverse maternal or neonatal outcomes have been found, with the possible (and controversial) exception of an increased need for phototherapy due to increased bilirubin levels
- ▶ Benefits to baby include: higher blood volume (up to 30%), higher birth weight, higher hemoglobin concentrations, smoother cardiopulmonary transition, increased number of beneficial stem cells, higher iron stores, increased antioxidant capacity, decreased inflammatory effects, and decreased risk of anemia and necrotizing enterocolitis (Sloan 2012; Mercer JS, Skovgaard R 2002; McDonald et al. 2013; Díaz-Castro et al. 2014; Rabe et al. 2012; Mercer 2010; Carter et al. 2010; Chaparro 2011; Andersson et al. 2011; Ceriani et al. 2010; Morley 2002)

As the Baby, I Want...



- My cord to finish pulsing before it is clamped



Unclamped cord over the course of 15 minutes.
Photo Credit: www.blessedbethebelly.com

Breastfeeding

- Globally, less than 40% of infants under six months of age are exclusively breastfed (WHO 2015)
- “If every child was breastfed within an hour of birth, given only breast milk for their first six months of life, and continued breastfeeding up to the age of two years, about 800,000 child lives would be saved every year” (Black, Victora, Walker, and the Maternal and Child Nutrition Study Group 2013)



Photo Credit: www.birthbootcamp.com

Breastfeeding

- ▶ WHO recommends exclusive breastfeeding for the first six months of life, at which time solid foods can be introduced to complement breastfeeding for up to two years or more
 - ▶ Breastfeeding should begin within an hour of birth
 - ▶ Breastfeeding should be “on demand”—as often as the child wants, day and night
 - ▶ Bottles or pacifiers should be avoided (WHO 2015)

**Breastfeeding is
recomended for at
least 6 months...**



Photo Credit:
www.breastfeeding.seenhs.uk

Breastfeeding

Breastfeeding is associated with huge short-term and long-term benefits for babies:

- Provides the nutrients the baby needs for healthy development: “the ideal food for newborns and infants” (WHO 2015)
- Short-term, decreases the baby’s risk of diarrheal diseases, ear infections, pneumonia and other respiratory illnesses (WHO 2015; Stuebe 2009; WebMD 2015; WHO 2013)
- Breastfed infants experience appropriate jaw, teeth and speech development as well as overall facial development (LLL 2015)
- Long-term, decreases the risk of obesity, diabetes, asthma, and allergies (WHO 2015; Stuebe 2009; WebMD 2015; Horta et al. 2007)
- Breastfed infants perform better on intelligence tests later in life (WHO 2015)
- Bonding of the mother-baby dyad is significantly enhanced (WHO 2015; WebMD 2015; LLL 2015)



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www.theplaceforfamilies.com

Breastfeeding



Photo Credit:
www.womenhealth.gov

Breastfeeding is also highly beneficial to the mother:

- Releases prolactin and oxytocin, which helps mom and baby fall in love with one another
- Oxytocin also reduces uterine bleeding after birth and helps mother's uterus return to its pre-pregnancy size (WHO 2015; Stuebe 2009; WebMD 2015)
- Burns extra calories to help mothers lose their excess pregnancy weight (WebMD 2015)
- Associated with a natural (though not fail-safe) method of birth control: 98% protection in the first six months with **exclusive** breastfeeding (WHO 2015)
- Reduces risk of postpartum depression (WHO 2015)
- Long-term, reduces rates of breast cancer and ovarian cancer (LLL 2015)

The Microbiome: Step 3 Breastfeeding



The Microbiome: Step 3

Breastfeeding

- ▶ Breastfeeding is the postnatal method for mother-baby microbial exchange; it “seeds” and selects for particular populations of bacteria (Mueller et al. 2015)
- ▶ Breastmilk has anti-inflammatory hormones, antibodies, and sugars (oligosaccharides), which are indigestible by the baby
- ▶ Those sugars (oligosaccharides) are eaten by the good bacteria that are newly seeded in the baby’s gut; in other words, breastmilk helps the good bacteria thrive
- ▶ By the end of baby’s first year, the microbiome has become more complex and stable
- ▶ The child’s microbiome will be similar to an adult microbiome by three years of age; in other words, the child’s microbiome at three years old is likely to be that individual’s “lifelong signature” of microbiota (Mueller et al. 2015; Groer et al. 2014)

The Research Shows...



- ▶ Breastfeeding is extremely beneficial—in both the short-run and the long-run—to both babies and their mothers (WHO 2015; Stuebe 2009; WebMD 2015; WHO 2013; LLL 2015; Horta et al. 2007)
- ▶ Breastfeeding is the third crucial step in helping the baby develop a healthy microbiome (Harman T, Wakeford A 2014; Mueller et al. 2015; Berzirtzoglou E, Tsiotslas A, Weilling GW 2011; Cabrera-Rubio R et al. 2012; Song SJ, Dominguez-Bello MG, Knight R 2013; Praveen P, Jordan F, Primai C, Morine MJ 2015; Guaraldi F, Salvatori G 2012; Thompson et al. 2015; Dewey 2013)

As the Baby, I Want...



- My mom to exclusively breastfeed me for six months, at which time I will be introduced to solid foods
- My mom to continue breastfeeding me from six months up to two years (or longer!) as I also eat solid foods

“The Evidence-Based Baby Model (for Low-Risk Women)” As the Baby, I Want...



Microbiome Health

- My mom to have a healthy microbiome herself
- To experience an antibiotic-free vaginal birth, at home or surrounded by items brought from home
- To experience immediate skin-to-skin with my mom, followed by couplet care
- To be exclusively breastfed for 6 months or more

Care Provider

- My mom to hire a midwife for prenatal, and labor and delivery care
- My mom to hire a doula to work with her throughout pregnancy and to attend her during labor

Birth Facility

- My mom to seek midwifery-led care, whether in a hospital-based birthing center or elsewhere
- My mom to consider a birthing center birth or a planned home birth

“The Evidence-Based Baby Model (for Low-Risk Women)” As the Baby, I Want...



Estimated Due Date

- My mom to be provided with a range of likely birth dates, based upon: my mom's LMP, and possibly one early ultrasound completed between 11-14 weeks of gestation

Exercise During Pregnancy

- My mom to exercise regularly both before her pregnancy and during her pregnancy—for her health and mine

Prenatal Ultrasound

- My mom to possibly have one “early ultrasound” (preferably between 11-14 weeks) for gestational dating and to detect whether she is carrying a twin
- My mom to decline late second trimester and all third trimester ultrasounds—including for amniotic fluid index testing or for conducting a BPP—unless there was a reason for concern that she discussed thoroughly with her care provider

“The Evidence-Based Baby Model (for Low-Risk Women)”

As the Baby, I Want...



Prenatal Perineal Massage

- My mom to practice perineal massage on herself, or with the help of her partner
- My mom to feel free to use a warm compress on her perineum during labor to ease me out into the world

Saline Lock

- My mom to politely decline the saline lock, so that she can focus more on her deep relaxation for an easier, gentler birth

Fetal Monitoring

- My mom to have intermittent auscultation during labor

“The Evidence-Based Baby Model (for Low-Risk Women)”

As the Baby, I Want...



Length of Labor

- My mom to labor at home until she is in active labor
- My mom to be given an adequate amount of time to labor and to breathe/nudge me down (what other people call “pushing”)
- My mom’s birthing space to be supportive of her natural birth wishes
- My mom to have supportive, **patient** care providers who will provide her with comfort measures and the gift of time—no rushing

Birthing Positions

- My mom to “nudge/push/breathe me down” in whichever position feels most comfortable to her, with an emphasis on more upright positions, and an emphasis on changing positions whenever she feels the need or desire

Skin-to-Skin

- My mom and me to experience immediate skin-to-skin contact
- My mom and me to be left undisturbed for bonding, initial breastfeeding, and the “seeding” of my microbiome from skin contact with my mom during “The Golden Hour” and beyond
- Care providers to do any newborn checks while I am experiencing SSC with my mom—“hands-off” from the care providers, as much as possible

“The Evidence-Based Baby Model
(for Low-Risk Women)”
As the Baby, I Want...



Cord Clamping

- My cord to finish pulsing before it is clamped

Breastfeeding

- My mom to exclusively breastfeed me for six months, at which time I will be introduced to solid foods
- My mom to continue breastfeeding me from six months up to two years (or longer!) as I also eat solid foods

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